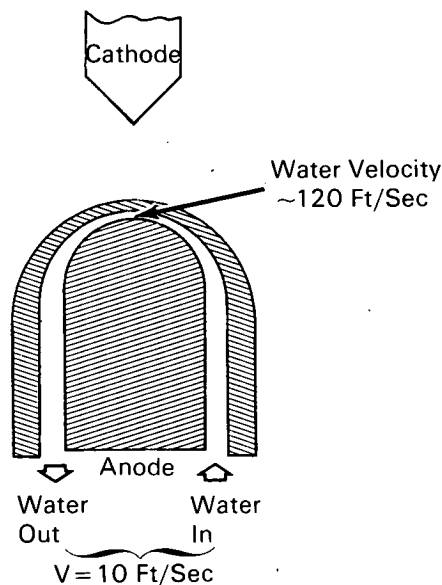


NASA TECH BRIEF



NASA Tech Briefs are issued to summarize specific innovations derived from the U.S. space program, to encourage their commercial application. Copies are available to the public at 15 cents each from the Clearinghouse for Federal Scientific and Technical Information, Springfield, Virginia 22151.

Water Cooled Anode Increases Life of High Temperature Arc Lamp



The problem:

To devise a means for increasing the life of the anode of a high temperature compact arc lamp. A solar simulator has been designed to use a 20 kilowatt water cooled lamp. The life of the lamp is dependent on the life of the anode and because of the high operating temperature and inadequate cooling, the copper and tungsten anodes have failed prematurely. Earlier methods sprayed jets of water from various positions on the anode hot spot without success. Since the compact arc lamp is relatively expensive, an increased life is desirable.

The solution:

Provide a shaped water passage through the tip or hottest point of the anode so that water will flow through it at a relatively high velocity.

How it's done:

The shaped water passage through the anode provides a Venturi effect at the hot spot of the anode. The water flows in at approximately 10 feet per second and accelerates through the narrow portion to approximately 120 feet per second. The Venturi effect provides a fast flow of water over the area of the greatest heat, i.e., the "hot spot" of the anode thereby providing the greatest cooling in that area. The water then slows down to approximately 10 feet per second in the outlet.

Notes:

1. A device has been fabricated and tested for a period of over 400 hours at 20 kilowatts, and 100 hours at 25 kilowatts without anode failure.

(continued overleaf)

2. This anode could be used wherever compact arc lamps are used such as motion picture projectors, search lamps, and commercial solar simulators.
3. Inquiries concerning this innovation may be directed to:

Technology Utilization Officer
NASA Pasadena Office
4800 Oak Grove Drive
Pasadena, California 91103
Reference: B67-10247

Patent status:

No patent action is contemplated by NASA.

Source: Harold N. Riise
Jet Propulsion Laboratory
(NPO-10180)